DESCRIPTION

SEPTIC TANK KIT

Cross-Reference to a Related Application

This application is a continuation application of co-pending patent application Serial No. 10/439,024, filed May 14, 2003, and claims the benefit of provisional patent application Serial No. 60/450,974, filed February 28, 2003 and provisional patent application Serial No. 60/415,458, filed October 1, 2002; both of which are hereby incorporated by reference in their entirety.

Field of the Invention

The present invention relates generally to septic tanks, and more particularly, to a septic tank kit which can optionally be assembled at the site of installation.

Background of the Invention

Septic tanks are typically used at dwellings that are not connected to public sewage facilities. The septic tank is typically located underground and is basically a batch sewage processor. Sewage from the dwelling is sent to the septic tank where it is acted on by microorganisms, where through biochemical reactions the sewage is decomposed. Subsequently, liquid and gaseous effluent is discharged into the surrounding soil. Solids remaining in the tank are periodically cleaned. More information regarding septic tanks can be found in, for example, Woodson, R. Dodge: Builder's Guide to Wells and Septic Systems, McGraw Hill; and Burks, Bennette D. and Mary Margaret Minnis: Onsite Wastewater Treatment Systems, Hogarth House, Ltd. Both of these are incorporated herein by reference to the extent they are not inconsistent with the following explicit teachings.

Prior art septic tanks are often made of concrete, glass fiber reinforced resin materials, or rotationally molded plastic materials. Because of the septic tank size and weight, they are typically transported to the work site by truck, and may require a crane for placing into position.

Brief Summary of the Invention

The septic tank of the subject invention is available as a septic tank kit which can be assembled on site comprising, in a preferred embodiment, a tank lid, a tank bottom, a pair of opposing side walls, and a pair of opposing end walls having a tank flow outlet and a tank flow inlet, where a flange is affixed at the tank flow outlet and at the tank flow inlet. The tank lid preferably comprises a pair of lid openings, which are covered by removable hatch covers. The hatch covers preferably comprise a hatch handle for ease of removal and in one embodiment are removably affixed to the tank lid with angle connection brackets.

The septic tank is assembled using angle connection brackets, where the brackets are affixed to the tank lid, tank bottom, side walls, and end walls using fasteners such as, for example, stainless steel cap screws. A silicone sealant can be interposed between the tank lid, tank bottom, side walls, end walls, and the connection brackets, forming a substantially leak proof sealing gasket.

The septic tank kit further preferably comprises a baffle positioned within the septic tank to form two compartments: an inlet compartment ideally but not necessarily encompassing approximately 2/3 of the total volume of the tank, and an outlet compartment. The baffle presents a barrier which enables the larger sediment to settle in the inlet compartment, with the remaining effluent flowing into the outlet compartment through a baffle port and/or over the top of the baffle if the baffle does not extend completely from the floor of the tank to the tank's ceiling.

To provide greater structural rigidity, the septic tank can comprise structural support. In embodiments with a baffle, the baffle extends upward from the bottom of the tank and from one side of the tank across to the other, thereby providing some additional internal horizontal support. If the baffle is an embodiment that extends upward completely to the tank's ceiling, then it also provides additional internal vertical support. However in embodiments without a baffle, even when a baffle is present, additional internal support may be desired. For example, the inlet compartment can comprise vertical and horizontal structural supports, where at least one vertical support member is interposed between the tank lid and the tank bottom, being connected to the tank bottom using, for example, a flange or collar. The inlet compartment can further comprise two or

more horizontal support members, wherein at least one horizontal support is connected to and interposed between the side walls, and the at least one other horizontal support is connected to and interposed between the inlet end wall and the baffle. The vertical support can be affixed to the horizontal supports to provide greater stability.

The outlet compartment can optionally comprise at least one horizontal support, where the horizontal support is connected to and interposed between the outlet end wall and the baffle. Obviously, in view of the teachings herein, if vertical or other horizontal supports are desired in the outlet compartment, they are easily provided as will be readily apparent to the skilled artisan.

For ease of use and transportation to the work site, the septic tanks taught herein are available in an unassembled condition where they can then be assembled on the work site. Although not necessary, it is preferred that kits according to the subject invention include instructions for assembly into septic tanks.

This is the first teaching of using sheet plastic, or flat plastic panels, for the construction of septic tanks. Acceptable plastics include, but are not limited to, such plastics as homopolymer polypropylene (homopolymer) or copolymer polypropylene (copolymer). As will be readily apparent to the skilled artisan in view of the teachings herein, any and all plastics available as sheet stock (*i.e.*, PVC, polyethylene) can be used to practice the subject invention. It is also the first teaching of the use of extrusion welding in the manufacture of septic tanks. Extrusion welding is a well-known technique where an extruded plastic wire, (for example, 1/8" or 3/16" diameter polypropylene) is superheated, melting and effectively forming a caulk between two plastic sheets or panels. Superheated air from the tip of the welding gun also heats and melts the panels and the bead of caulk forming a homogeneous weld bonding the sheets (or whatever other forms of plastic are the subject of the weld) together. In addition, the subject invention constitutes the first use of plastic angles and special plastic extrusions (such as, for example, right angle brackets of PVC, copolymer polypropylene or homopolymer polypropylene) with fasteners (such as, for example, stainless steel screws) to manufacture or assemble septic tanks.

All patents, patent applications and publications referred to or cited herein, or from which a claim for benefit of priority has been made, are incorporated by reference in

their entirety to the extent they are not inconsistent with the explicit teachings of this specification, including U.S. Patent No. 4,882,046; U.S. Patent No. 4,961,670; U.S. Patent No. 5,361,930; and U.S. Patent No. 6,280,614.

Brief Description of the Drawings

Figure 1 is a perspective view of one embodiment of the subject invention assembled septic tank kit.

Figures 2A-D are perspective views of the septic tank assembly of the subject invention of Figure 1 with the tank lid and hatches shown off.

Figure 3 is a top view of a septic tank according to the subject invention.

Figure 4 is a side view of a septic tank according to the subject invention.

Figure 5 is an end view of a septic tank according to the subject invention.

Figures 6A-F are open top views of a septic tank according to the subject invention.

Figures 7A-E are open-end views of a septic tank according to the subject invention.

Figure 8A-D are side views of the vertical section of a septic tank according to the subject invention.

Figure 9 is a perspective exploded view of a septic tank kit according to the subject invention.

Figure 10 is a cross-sectional view of an embodiment of the double-channel angle connection bracket according to the subject invention.

Figure 11 is the cross-sectional view of the double-channel angle connection bracket depicted in Figure 10, but with modified reference points for additional disclosure regarding specific dimensions of one embodiment described herein.

Figure 12 is a not-to-scale open top perspective view of an embodiment of a septic tank according to the subject invention which has a substantially trapezoidal cross-sectional appearance.

Figure 13 is a not-to-scale open top perspective view of an embodiment of a septic tank according to the subject invention which has a substantially trapezoidal cross-sectional appearance.

Figure 14 is a not-to-scale perspective view of an embodiment of a septic tank according to the subject invention which has a substantially triangular cross-sectional appearance.

Figure 15 is a not-to-scale open top perspective view of an embodiment of a septic tank according to the subject invention which has a substantially triangular cross-sectional appearance.

Figure 16 depicts yet another alternative embodiment of a septic tank according to the subject invention which is substantially an inverted triangular-based pyramid in appearance, depicted with an open top.

Figure 17 depicts a side elevation of single unit modular riser according to the subject invention.

Figure 18 depicts a top view of a single unit modular riser according to the subject invention.

Detailed Disclosure of the Invention

As shown in Figures 1 and 9, one embodiment of a septic tank according to the subject invention comprises a tank lid **2**, a tank bottom **18**, a pair of opposing side walls **8**, and a pair of opposing end walls **20, 21**, an inlet end wall **20** and an outlet end wall **21**. The tank lid **2** preferably comprises a pair of lid openings **16**, which are covered by hatch covers **1**. The hatch covers **1** each comprise a hatch handle **3** for ease of removal and are removably affixed to the tank lid **2** with angle alignment brackets **19** using, for example, stainless steel cap screws **7**.

As shown in Figure 8, the outlet **21** and inlet end walls **20** comprise tank flow outlet **4** and a tank flow inlet **5** respectively, where a flange **6** is affixed to each of the

tank flow outlet **4** and tank flow inlet **5**. The flange **6** is used to connect each of the flow inlet **5** and flow outlet **4** to the dwelling and drain field, respectively. In a preferred embodiment, flanges **6** can be plastic collars that are attached at tank flow outlet **4** and tank flow inlet **5** with a deformable O-ring seal placed between the collar and the surface of the end wall to provide a flexible seal. In a particularly preferred embodiment, flanges **6** at tank flow outlet **4** and tank flow inlet **5** are made of a flexible plastic or rubber, which is deformable while still maintaining an effective seal. Especially preferred in this regard are flanges such as the POLYLOK III, a septic tank seal available from Polylok, Inc., Yalesville, Connecticut.

In an embodiment, as shown in Figures 6-9, the septic tank is assembled using angle connection brackets **11**, which can be plastic or made of some other material rigid enough to permit the assembled tank to retain its structural integrity (such as, for example, stainless steel), wherein the brackets **11** are affixed to the tank lid **2**, tank bottom **18**, side walls **8**, and end walls **20**, **21** using, for example, stainless steel cap screws **7**. A silicone sealant **17** is interposed between the tank lid **2**, tank bottom **18**, side walls **8**, end walls **20, 21** and the connection brackets **11,** forming a substantially leak proof sealing gasket. Alternatively in this and other embodiments of the tank, other sealants such as PERMATEX or GE II silicone rubber sealant could be used as will be readily apparent to the skilled artisan. Further, the angle connection brackets can optionally be provided with sealant material prior to packaging of the kit. In an embodiment, the sealant material can be of a different color from the panels which serve as tank walls, top, or bottom; and different from the color of the connection bracket; so that one can readily see that the sealant has been applied. Alternatively, or in addition to use of screws in assembly of this and other embodiments of the tank, extrusion welding can be used to connect and/or seal the various panels and other plastic parts to each other.

In an embodiment, the septic tank kit further comprises a baffle **10,** wherein the baffle **10** is positioned within the septic tank forming two compartments: an inlet compartment **22** encompassing approximately ⅔ of the total volume of the tank, and an outlet compartment **23**. The baffle **10** presents a barrier which enables the larger sediment to settle in the inlet compartment **22**, with the remaining effluent flowing into the outlet compartment **23** through the baffle port **12**. Optionally, baffle **10** does not comprise a baffle port, in which case the baffle **10** should not extend completely from the tank

bottom all the way to the tank top so that flow from the inlet compartment **22** into the outlet compartment **23** is accomplished over the top of baffle **10**.

In an embodiment, the septic tank kit further comprises a plurality of structural support members **13**, wherein the structural support members **13** are vertically and horizontally affixed to the tank bottom **18**, side walls **8**, and end walls **20, 21** optionally using a flange **6** at each attachment point. If flanges **6** are used to affix structural support members, then for this purpose it is generally preferred that they be of a relatively rigid construction, sufficiently rigid to ensure that the structural support members are affixed in place.

In an alternative embodiment, the structural supports **13** are connected to the tank bottom **18**, side walls **8**, and end walls **20, 21** using angled connectors **15**.

In an embodiment, as shown in Figure 9, the septic tank comprises two sets of structural support members **13**. The inlet compartment **22** comprises at least three structural supports **13**, a vertical support member **24** interposed between the tank lid **2** and the tank bottom **18**, being connected to the tank bottom **18.** The inlet compartment **22** further comprises two horizontal support members **25, 26**, wherein a first horizontal support **25** is connected to and interposed between the side walls **8**, and a second horizontal support **26** is connected to and interposed between the inlet end wall **20** and the baffle **10**. The outlet compartment **23** comprises at least one horizontal support **27**, wherein the horizontal support **27** is connected to and interposed between the outlet end wall **21** and the baffle **10**.

In an embodiment, the structural support members **13** are 3" diameter schedule 80 PVC pipe. Three different exemplary embodiments for common tank applications are, for example, ½" thick bottom, sides, and ends, with a ¾" thick lid; ⅝" thick bottom, sides, and ends, with a ¾" thick lid; and ¾" thick bottom, sides, ends, and lid. Angle brackets in an embodiment can be 2" x 2" x 0.2" right angles, and the fasteners can be, for example, stainless steel screws such as, for example, ¼" x 14 x 1¼ " or ¼" x 14 x 1 ½" hex head screws. As the ordinary artisan will readily appreciate, the dimensions of the panels, angles, support members, and fasteners can be optimized for the particular task at hand, considering the strength of the materials involved. Preferably, for most standard septic tank volumes, if the panels are made of copolymer polypropylene, they

will be at least ¼" thick and no more than 4" thick, although depending on the volume of tank desired, it may be optimal to have panels with thicknesses outside of this range, as will be within the skill of the ordinary artisan to make such optimizations. As an example of the advantageous weight characteristics of septic tanks constructed in accord with the teachings herein, the following is a list of approximate weights of certain embodiments of tanks having various volumes, wherein the tanks are made with bottoms, sides, and ends of ½" thick copolymer and lids of ¾" thick copolymer:

Tank Volume in Gallons	Approximate Weights (pounds)
300	~ 350 lbs.
750	~ 625 lbs.
900	~ 700 lbs.
1050	~750 lbs.
1200	~ 810 lbs.
1500	~ 950 lbs.

The foregoing are merely intended to illustrate the advantageous weight benefits of the subject tanks (as compared to the much heaver prior art concrete tanks of the same volume). The weights can vary depending on a number of factors such as panel thickness, panel dimension, various associated hardware (such as some types of fasteners), panel composition, etc., as would be readily apparent to the skilled artisan, and still would be within the scope of the subject invention.

In an embodiment, the septic tank lid **2**, a tank bottom **18**, a pair of opposing side walls **8**, pair of opposing end walls **20, 21,** and hatch covers **1** are made of plastic that is copolymer, or homopolymer.

In an embodiment, the septic tank lid **2** comprises only one opening.

In an embodiment, the tank flow inlet and tank flow outlet can be disposed in the same panel, preferably separated by a baffle.

In alternative embodiments, any hatch covers can be made of the same, or different, materials than the sides, ends, bottom, and lid.

Although septic tanks of the subject invention can be assembled and then transported to the site of intended use for subsequent installation, in a method of use, the septic tank, which is available in kit form, is assembled at the work site. The septic tank is transported to the work site and assembled as follows:

In an embodiment, the end walls **20, 21** and side walls **8** are connected to the tank bottom **18** with the angle connection brackets **11**, wherein the brackets **11** are affixed using, for example, stainless steel cap screws **7**. Prior to assembly, a silicone sealant **17** is interposed between the tank bottom **18**, side walls **8**, and end walls **20, 21** and the connection brackets **11**, forming a substantially leak proof seal to allow for proper function of the septic tank.

In a preferred embodiment, connection brackets **11** are in the form of double-channel angle brackets similar to that depicted in Figures 10 and 11. Referring to Figure 10, the double-channel angle bracket of the subject invention comprises a deep panel receiving channel **101** and a shallow panel receiving channel **102** defined by external panel retaining walls **107** and internal panel retaining walls **108**. In the embodiment depicted in Figure 10, deep panel receiving channel **101** and shallow panel receiving channel **102** are oriented perpendicular to each other, for ease of assembling substantially flat, sheet plastic panels into a septic tank having two sides, two ends, a lid, and a bottom, for example such as depicted in Figures 1-9. Flat panels are preferred for use according to the teachings herein, for ease of packaging the kit and sealing the tank. However, as will be readily apparent to the skilled artisan, absolute flatness is not a requirement to practice the subject invention. Preferably, the panels of the bottom, sides, ends, and lid are substantially flat. A "substantially" flat panel is one which deviates from its plane by no more than d, where $d^2 = (.05)A$, where A is the area of the panel in square inches. The plane of the panel can be defined by any 3 corners of the panel. In a preferred embodiment, $d^2 = (.045)A$; it is more preferred that $d^2 = (.04)A$; it is still more preferred that $d^2 = (.035)A$; even more preferred that $d^2 = (.03)A$; yet even more preferred that $d^2 = (.025)A$; particularly preferred that $d^2 = (.02)A$; more particularly preferred that $d^2 = (.015)A$; and most preferred that $d^2 = (.01)A$.

In alternative embodiments of the septic tank of the subject invention, the angle between the deep panel receiving channel and the shallow panel receiving channel can be

either acute, or obtuse, as is required based on the intended ultimate configuration of the tank. For example, for the assembly of a tank having triangular side panels assembled in pyramidal form, all angles would be acute. See, for example, Figure 16. Alternatively, tanks having a substantially trapezoidal cross-sectional appearance would comprise double-channel angle brackets which in some cases possessed an acute angle between the deep panel receiving channel and the shallow panel receiving channel, and in other places would require an obtuse angle between the panel receiving channels, as would be readily apparent to one of ordinary skill in the art viewing the embodiments depicted in Figures 12 and 13. Other embodiments, such as those having, for example, an octagonal cross-sectional appearance, would incorporate the use of double-channel angle brackets having predominantly obtuse angles between the receiving channels.

Returning to the embodiment depicted in Figure 10, at the closed end of each receiving channel is preferably located a bottom stop **103** which is a slightly raised portion intended to prevent the edge of the inserted plastic panels from fully contacting the bottom of the panel receiving channels. Side stops **104** extend into the panel receiving channels by protruding from the inner surfaces of external panel retaining walls **107** and from the inner surfaces of internal panel retaining walls **108**. Each side stop is defined in part by sloped panel accommodation surface **105** and sealant retaining surface **106**. Each sealant retaining surface **106** is preferably substantially perpendicular to the internal surface of the panel retaining walls **107** and **108** to more effectively retain compressed sealant within the interior of each panel receiving channel. In operation, side stops **104** serve to assist in centering the panels in their respective panel receiving channels, and also to retain sealant material compressed within the panel receiving channels. In a method of use, sealant is applied to the bottom of a panel receiving channel. As the panel is inserted into the panel receiving channel, its leading edges may encounter the sloped panel accommodations surfaces **105** of side stops **104**. In a preferred embodiment, the sloped panel accommodation surface is angled so as to allow the leading edge of the panel to slide downward towards the bottom of the receiving channel. A panel is inserted fully into the channel, compressing the sealant until the panel contacts bottom stop **103**. Sealant is forced up each side of the panel receiving channel and retained therein by sealant retaining surfaces **106** of each side stop **104**.

As will be readily apparent to the ordinary skilled artisan, the panel thickness can

vary depending on the size of the tank desired and the strength of the materials from which the panel is made, and the dimensions of the double-channel angle bracket according to the subject invention can be appropriately modified accordingly. However, for illustrative purposes, an example of a double-channel angle bracket depicted in Figure 11 has dimensions which are suitable for accommodating panels of ½ inch thickness, and are as follows:

AB and ST are ⅝ inch

CD, EF, IJ, RS, and TU are ¼ inch

GH is 2⅛ inches

KL and VW are 1⅛ inch

MN is 1¼ inch

PQ is ½ inch

QT and PS $\frac{1}{16}$ inch and

X is effectively a 90° angle causing deep panel receiving channel **101** and shallow panel receiving channel **102** to be perpendicular, with the internal corner at X effectively rounded at ¼ inch radius.

In a embodiment, the double-channel angle connection brackets can be provided with predrilled holes through which fasteners, such as stainless steel screws or any other fastener known to those of ordinary skill in the art which is effective for assembling the tank, can be inserted. In an alternative embodiment, the double-channel angle bracket can be drilled at the site of assembly. Optionally, as provided in the kit according to the subject invention, the double-channel connection brackets can be premounted on one or more of the edges of one or more of the panels in the septic tank kit.

In an embodiment, a baffle **10** is positioned within the partially assembled septic tank, forming two compartments, an inlet compartment **22** and an outlet compartment **23**, where the inlet compartment **22** encompasses approximately 2/3 of the total volume of the tank. The baffle **10** presents a barrier which enables the larger sediment to settle in the inlet compartment **22**, with the remaining effluent flowing into the outlet compartment **23**

through the baffle port **12**.

In an embodiment, structural support members **13** are positioned within and connected to the tank bottom **18**, side walls **8**, and end walls **20, 21**. The inlet compartment **22** comprises at least three structural supports **13**, a vertical support **24** interposed between the tank lid **2** and the tank bottom **18**, being connected to the tank bottom **18.** The inlet compartment **22** further comprises two horizontal supports **25, 26**, where a first horizontal support **25** is connected to and interposed between the side walls **8**, and a second horizontal support **26** is connected to and interposed between the inlet end wall **20** and the baffle **10**. The outlet compartment comprises at least one horizontal support **27**, wherein the horizontal support **27** is connected to and interposed between the outlet end wall **21** and the baffle **10**.

The tank lid **2** is positioned on top of the partially assembled septic tank and connected to the brackets **11** using fasteners, such as, for example, stainless steel screws.

In an embodiment, the tank lid **2** comprises pre-drilled connection holes to facilitate attachment to the brackets **11**.

In an embodiment, either or both of the tank lid **2** and tank bottom **18** can be provided in the kit with the connection brackets preattached to at least one edge thereof. In a preferred embodiment, double-channel angle connection brackets according to the subject invention are provided in the kit preattached to the edges of either or both of the tank lid **2** and tank bottom **18**, preferably with the connection bracket affixed to the lid panel such that the edge of the lid panel is inserted into deep panel receiving channel **101** of each double-channel connection bracket affixed to its perimeter. Similarly, in an embodiment the bottom panel has double-channel connection brackets affixed thereto such that the panel edges are inserted into the deep panel receiving channel **101** of each double-channel connection bracket around its periphery. In this embodiment, as the kit is unpacked and the tank is assembled, the tank bottom **18** having double-channel angle connection brackets preaffixed around its periphery will be configured such that side panels can be inserted into shallow panel receiving channels **102** and then ultimately the tank lid, also having double-channel angle connection brackets affixed around its periphery can be lowered into place, with the top edges of the panels making up the side and end walls being inserted into the downward oriented shallow panel receiving

channels **102** projecting perpendicularly downward from the periphery of the tank lid. Connection brackets are preferably used to connect the side walls to the end walls along the vertical edges where they meet. In a preferred embodiment, fasteners are inserted through the connection brackets and the panels contained therein to fasten the walls, top, and bottom of the tank in place. Extrusion welding can optionally replace or augment the connection of panels one to another.

The hatch covers **1** are positioned and connected to the tank lid **2** using alignment brackets **19** and appropriate fasteners, such as, for example, stainless steel screws.

In an embodiment, the tank lid **2** and the hatch covers **1** comprise pre-drilled connection holes to facilitate attachment to the alignment brackets **19**.

Frequently, tanks according to the subject invention as well as other tanks of similar purposes, will be installed at a distance significantly below grade. In such cases risers are often needed to provide a link from the lid opening in a tank up to the grade surface. Because the distance that any particular tank is required to be buried below grade can vary depending on location and purpose, it is necessary that risers of various heights be available for use in connection with tanks according to the subject invention. In that regard, advantageously provided are modular risers, which can be made in a variety of heights, that are easily mounted to lid openings in tanks, and which can be sealably stacked one on top of the other depending on the depth of each tank with which they are used. An example of a single unit modular riser according to the subject invention is depicted in Figures 17 and 18. Such risers can advantageously be made of the same materials as the tanks of the subject invention. Preferably, the risers are made of a number of panels ¾ inch copolymer polypropylene, but the thickness of the material can vary depending on the anticipated loads it is to bear and depending on the strength of materials used in its construction. Figures 17 and 18 show a riser according to the subject invention having a horizontal bottom portion **751** and a horizontal top portion **752**. Bottom portion **751** and top portion **752** are preferably square or rectangular in shape, and have internal edges **756** defining a centrally located opening **760** which allows passage through each of **751** and **752**. Bottom portion **751** can be made as a single piece unit, or, in a preferred embodiment, is made by connecting four planks at substantially right angles one to another, mitered at the corners for better fit, secured by screws **754** with the

mitered joints welded for additional strength. Top portion **752** can be similarly constructed. Top portion **752** is provided with downwardly extending sidewalls **753** which are also preferably ¾ inch copolymer polypropylene, and define an internal space which connects the centrally located opening **760** of top portion of **752** with the centrally located opening of bottom portion **751**. As will be apparent to the skilled artisan in view of the teachings herein, although a preferred embodiment comprises four panels acting as sidewalls to define an internal space of substantially square or rectangular cross-sectional appearance, the panels could be configured to provide a trapezoidal cross-section; or 3 panels could provide a triangular cross-section; or 5 panels could provide a pentagonal cross-section; a hexagonal cross-section would result from 6 panels; etc. Even more panels could be used as is readily apparent from the foregoing. The panels which serve as sidewalls **753** are preferably mitered at the corners and welded where they meet for greater strength and water tightness. In addition to welding, screws such as, for example, #10 1½ inch stainless steel round washer head slot shank screws 2-inch on centers can be used to hold the panels together. Top portion **752** and bottom portion **751** can then be attached to the top and bottom ends, respectively, of the side walls **753** to form a single unit modular riser, such as that depicted in Figure 17. In a preferred embodiment, all internal corners are welded, and top portion **752** and bottom portion **751** are additionally secured in place with stainless steel screws. Preferably, screws **757** used to attach bottom portion **751** to side walls **753** are countersunk. Similarly, it is preferred that screws **758** used to attach top portion **752** to side panel **753** are also countersunk. This permits sealable stacking of individual unit modular risers one on top of the other. To facilitate such stacking, it is preferable that the centrally located openings in the top portions and bottom portions of the risers be of the same shape and dimensions, as would be readily apparent to the skilled artisan. In operation, risers of various heights can be provided simply by manufacturing them out of side panels of various heights. For example, assuming all panels to be made of ¾ inch copolymer polyprolene, a 12-inch high riser would have side walls **753** constructed of panels 10 ½ inches high. If a 48-inch riser was needed for a particular application, instead of a single unit riser 48 inches high, one could stack two 24-inch high risers such that bottom portion **751** of one riser is attached to top portion **752** of another riser, preferably with #10 1½ inch stainless steel round washer head slot shank screws 2-inch on centers, and optionally welded together, or compressing a sealant material there between, or both. Bottom portion **751** of the bottom riser is

attached to the lid opening on a tank which is to be installed below grade. The top portion **752** of the uppermost unit of the modular riser is then connectable to a hatch cover which would be at or about grade when installation of the tank is complete.

In alternative embodiments, the septic tank kit can, upon assembly, yield tanks of various dimensions and configurations, as will be readily apparent to one of ordinary skill in the art in view of the teachings herein. For example, an alternative embodiment is depicted in Figure 12, wherein the assembled tank has a substantially trapezoidal cross-section appearance. Figure 12 depicts the tank without its lid, and without optional internal supports, being merely intended to illustrate the alternative configurations possible using substantially flat plastic panels in the kit of the subject invention. In Figure 12 are depicted opposing side walls **208**, inlet end wall **220**, outlet end wall **221**, tank flow inlet **204**, tank flow outlet **205**, tank bottom **218**, baffle **210**, and baffle port **212**.

Referring to Figure 13, an alternative embodiment, also of substantially trapezoidal cross-sectional appearance, is depicted open top. This embodiment represents an inversion of the embodiment depicted in Figure 12, but having improved anti-buoyancy characteristics due to the increased surface area of the tank lid (not depicted) as compared to the tank bottom **318**. In this embodiment are depicted inlet end wall **320**, outlet end wall **321**, tank flow inlet **304**, tank flow outlet **305**, opposing side walls **308**, baffle **310**, and baffle port **312**.

Yet another alternative embodiment is depicted in Figure 14, wherein the assembled tank has a substantially triangular cross-sectional appearance. Represented in Figure 14 are tank inlet end wall **420**, tank flow inlet **404**, side walls **408**, lid openings **416**, baffle **410**, baffle port **412**, tank outlet end wall **421**, and tank flow outlet **405**.

Turning now to Figure 15, yet another tank according to the subject invention is depicted which has a substantially triangular cross-sectional appearance, and is shown open top. As compared to the embodiment depicted in Figure 14, this embodiment has improved anti-buoyancy characteristics due to the substantial surface area of the tank top (lid not depicted), and the almost negligible surface area of the bottom, which is formed at the vertex of the meeting of side walls **508**. Also represented in this figure are tank inlet end wall **520**, tank flow inlet **504**, tank outlet end wall **521**, tank flow outlet **505**,

baffle **510**, and baffle port **512**.

Still another embodiment of a tank assembly provided in kit form according to the subject invention is depicted in Figure 16. This embodiment comprises a minimum of four substantially flat panels (if one excludes the optional baffle **610**, which is depicted in this configuration). Represented in Figure 16 are three triangular shaped sidewalls **608**, tank flow inlet **604**, tank flow outlet **605**, optional baffle **610**, and baffle port **612**. Not depicted is the triangular shaped panel which would serve as a lid for this embodiment of the tank. Excluding the optional baffle, this embodiment of the tank comprises four substantially flat panels.

As is readily apparent to one of ordinary skill in the art in view of the foregoing, a wide variety of septic tank configurations can be provided in kit form according to the teachings herein.

It should be understood that the examples and embodiments described herein are for illustrative purposes only and that various modifications or changes in light thereof will be suggested to persons skilled in the art and are to be included within the spirit and purview of this application.